Calculus on the TI-83/84 Graphing Calculators

*** * * Remember – Calculator <u>ALWAYS in RADIAN</u> mode * * ***

<u>Evaluating derivatives:</u> Example: Evaluate $f'(7)$ if $f(x) = 2x^3 - 5x^2 + \sqrt{7x}$

1. Enter $y_1 = 2x^3 - 5x^2 + \sqrt{7x}$
2. $Math\ 8 \rightarrow$  $\frac{d}{dx}(Y_1)|\ x = 7$ Answer: 224.5
3. (If no MathPrint, then Math 8 $\rightarrow$ nDeriv$(y_1, x, 7)$

[to enter y_1 go to VARS / Y-VARS / Function / 1]

<u>Evaluating values:</u> Example: Evaluate $f(7)$ if $f(x) = 2x^3 - 5x^2 + \sqrt{7x}$

1. Enter $y_1 = 2x^3 - 5x^2 + \sqrt{7x}$
2. Return to Home Screen: 2nd → Mode (Quit)
3. **go to VARS / Y-VARS / Function / 1**
4. $Y_1(7)$ press enter
5. Answer: (448)

<u>Finding Values on a Graph:</u> Example: $Y_1 = 0.5x^3 + x^2 - 2x - 1$

1) Set Window:
   a. Standard Window: **Xmin**: -10 **Xmax**: 10 **Ymin**: -10 **Ymax** 10
   (You will adjust window values on a case-by-case basis)
   b. Or enter Zoom → 6 (ZStandard)

2) Finding x-Intercepts:
   a. 2nd → Trace → 2:Zero
   b. Left Bound? (Scroll cursor to a point LEFT of **x-intercept** on graph then press ENTER)
   c. Right Bound? (Scroll cursor to a point RIGHT of **x-intercept** on graph then press ENTER)
   d. Guess? (Press ENTER)
   e. (Answer: x = -3.082, x = -0.428, x = 1.514)

3) Finding Relative Minimum on Graph:
   a. 2nd → Trace → 3: Minimum
   b. Left Bound? (Scroll cursor to a point LEFT of **rel. minimum** on graph then press ENTER)
   c. Right Bound? (Scroll cursor to a point RIGHT of **rel. minimum** on graph then press ENTER)
   d. Guess? (Press ENTER)
   e. (Answer: x = 0.666 y = -1.7407)

4) Finding Relative Maximum on Graph:
   a. 2nd → Trace → 4: Maximum
   b. Left Bound? (Scroll cursor to a point LEFT of **rel. maximum** on graph then press ENTER)
   c. Right Bound? (Scroll cursor to a point RIGHT of **rel. maximum** on graph then press ENTER)
   d. Guess? (Press ENTER)
   e. (Answer: x = -2 y = 3)

2nd Semester TI-83/84 Integral Steps:

Evaluating Definite Integrals

e.g. Evaluate $\int_{-2}^{11}\left(2x^3-5x^2+\sqrt{7x}\right)dx$

1. Enter $y_1=2x^3-5x^2+\sqrt{7x}$
2. **go to VARS / Y-VARS / Function / 1: Y_1**
3. Math 9 $\rightarrow$ $\text{FnInt}\left(y_1,x,-2,11\right)$

Evaluating Total Distance

e.g. Evaluate $\int_{0}^{5}\left|3x^2+11x+4\right|dx$

1. Enter $y_1=3x^2+11x+4$
2. Math 9 $\rightarrow$ $\text{fnInt}\left(Abs\left(y_1\right),x,0,5\right)$
3. The absolute value feature (Abs) is found in Math → Num → Abs

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Evaluating Value of a function

e.g. Evaluate $f(7)$ if $f\left(x\right)=3e^{2x}-\ln(x^2)$

1. Enter $y_1=3e^{2x}-\ln(x^2)$
2. $y_1(7)$

TI –36x Pro

Finding Values on a Graph:

1) Table → 2:Edit function
2) f(x) = $0.5x^3 + x^2 - 2x - 1$ (Press Enter)
3) Start = 0 (Press Enter) * This value you will adjust on a case-by-case basis
   Step = **0.5** (Press Enter) *This value you will adjust on a case-by-case basis
   Auto (Press Enter)
   CALC (Press Enter)

4) Estimate x-intercepts:
   a. Scroll through table and estimate where f(x) column (y-values) changes signs from – to + or from + to -
   b. Gain increased accuracy by adjusting step to smaller increments (ex. 0.1)
   c. Change your "start =" value to reduce the amount of scrolling
   d. (Answer: x = -3.082, x = -0.428, x = 1.514)

5) Estimate relative minimum:
   a. Scroll through table and estimate where f(x) column (y-values) changes from decreasing to increasing values
   b. Gain increased accuracy by adjusting step to smaller increments (ex. 0.1)
   c. Change your "start =" value to reduce the amount of scrolling
   d. (Answer: x = 0.666 y = -1.7407)

6) Estimate x-intercepts:
   a. Scroll through table and estimate where f(x) column (y-values) changes from increasing to decreasing values
   b. Gain increased accuracy by adjusting step to smaller increments (ex. 0.1)
   c. Change your "start =" value to reduce the amount of scrolling
   d. (Answer: x = -2 y = 3)